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PARSONS, THOMAS H	
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1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/519,554	YOSHIZAWA ET AL.	
	Examiner	Art Unit	
	THOMAS H. PARSONS	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *27 May 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

This is in response to the Amendment filed 27 May 2008.

(Previous) DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The rejections of claims 1-17 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention have been **withdrawn** in view of Applicants' Amendment.

Claim Objections

2. The objections of claim 14-17 because of minor informalities have been **withdrawn** in view of Applicants' Amendment.

Claim Rejections - 35 USC § 103

3. The rejections of claims 1-3, 5-6, and 11-14 under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (US 2002/0055031) in view of Kaufman et al. (US 4,588,661) have been **withdrawn** in view of Applicants' Amendment.

4. The rejection of claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. in view of Kaufman et al. as applied to claims 1-2 above, and further in view of Issacci et al. (US 2003/0129468) has been **withdrawn** in view of Applicants' Amendment.

5. The rejections of claims 7-8 and 15-17 under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. in view of Kaufman et al. as applied to claims 1-2, 5-6 and 14 above, and further in view of Takahashi et al. (7,049,016) have been **withdrawn** in view of Applicants' Amendment.

6. The rejections of claims 9 and 10 under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. in view of Kaufman et al. as applied to claims 1-2 above, and further in view of Ringel (US 5,932,366) have been **withdrawn** in view of Applicants' Amendment.

7. The rejection of claim 18 under 35 U.S.C. 102(b) as being anticipated by Fujii et al. (US 2002/0055031) has been **withdrawn** in view of Applicants' Amendment.

8. The rejections of claims 19-21 under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. as applied to claim 18 above, and further in view of Takahashi et al. (US 7,049,016) have been **withdrawn** in view of Applicants' Amendment.

Response to Arguments

9. Applicant's arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection.

(New) Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claims 1-3, 5-6, and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (US 2002/0055031) in view of Nelson et al. (US 6,150,049) in view of Kaufman et al. (US 4,588,661).

Claim 1: Fujii et al. in Figures 1-4 disclose a fuel cell, comprising:

a membrane electrode assembly (abstract), and

a monopolar plate (10) disposed outside the membrane electrode assembly, wherein: the bipolar comprises:

a first gas passage (211) formed on a surface on one side of the membrane electrode assembly,

a second gas passage (211b) formed on another surface on the opposite side of the first gas passage,

a communicating passage ((201) which allows the first gas passage and second gas passage to communicate with each other,

a gas inlet (12C) for introducing gas connected to one of the first gas passage, and second gas passage, and

a gas outlet (13C) for discharging gas connected to the other of the first gas passage and second gas passage. See paragraphs [0019]-[0024], [0026]-[0027], [0065]-[0125], [0135]-[0144].

Fujii et al. do not disclose a bipolar plate.

Nelson et al. disclose a bipolar plate. In particular, Nelson et al. on col. 4: 46-47, "As in known in the art, fluid flow plates may include bipolar and monopolar plates". See also col. 1: 38-46 and col. 4: 13-col. 6: 12.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the apparatus of Fujii et al. by incorporating bipolar plates as taught by Nelson et al. because Nelson et al. teach a bipolar plate that would have increased the hydration distribution along the membrane thereby improving the overall performance of the fuel cell.

The Fujii et al. combination discloses that the bipolar plate is made of a carbon material (paragraph [0150]) but is silent as to a porous bipolar plate.

Kaufman et al. in Figures 3, 5 and 6 disclose bipolar plates that are made of a porous carbon material. See abstract, col. 2: 3-26, col. 3: 67-col. 4: 15, and, col. 6: 1-col. 8: 59.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the bipolar plates of the Fujii et al. combination by incorporating the porous carbon plates of Kaufman et al. because Kaufman et al. teach porous carbon bipolar plates that would have provided a more uniform gas distribution over the face of the respective anode and cathode thereby improving the overall performance of the fuel cell.

Claim 2: The rejection of claim 2 is as set forth above in claim 1 wherein further Fujii et al. in Figures 1-4 further disclose that

the gas inlet (12C) is connected to the first gas passage (211A),

the gas outlet (13C) is connected to the second gas passage, and

gas introduced from the gas inlet (12C) flows through the first gas passage (211A), communicating passage (201)and second gas passage (211B) in that order, and is discharged from the gas outlet. See paragraphs [0019]-[0024], [0026]-[0027], [0065]-[0125], [0135]-[0144].

Claim 3: The rejection of claim 3 is as set forth above in claim 1 wherein further Fujii et al. in Figures 1-4 disclose that the second gas passage (211B) is formed on the opposite side of the first gas passage (211A) so that the second gas passage is back-to-back with the first gas passage, and the gas outlet (13C) is formed on the opposite side of the gas inlet (12C) so that the gas outlet manifold is underneath the gas inlet manifold.

Claim 5: The recitation "wherein: the pressure of the gas flowing through the first gas passage is higher than the pressure of the gas flowing through the second gas passage" has been considered, and construed as a process limitation that adds no additional structure to the fuel cell. However, because the fuel cell of the Fujii et al. combination is structurally similar to that instantly claimed, it appears capable of providing the claimed process limitation.

Claim 6: The recitation "wherein: a differential pressure between the first gas passage and the second gas passage, is produced by a pressure loss in the communicating passage" has been considered, and construed as a process limitation that adds no additional structure to the fuel cell. However, because the fuel cell of the Fujii et al. combination is structurally similar to that instantly claimed, it appears capable of providing the claimed process limitation.

Claim 11: The rejection of claim 11 is as set forth above in claim 1 and 2 wherein further Fujii et al in Figures 21-21 disclose that the communication passage is an external manifold provided outside the bipolar plate which allows the first gas passage and the second gas passage to communicate (paragraphs [0235]-[0253]).

Claim 12: The rejection of claim 12 is as set forth above in claim 1 wherein further Fujii et al. in Figure 2 disclose a cooling mechanism which cools the bipolar plate. See paragraphs [0019]-[0024], [0026]-[0027], [0065]-[0125], [0135]-[0144].

The recitation "wherein: the cooling mechanism cools the bipolar plate so that the temperature of the gas flowing through the second gas passage is lower than the temperature of the gas flowing through the first gas passage" has been considered, and construed as a process limitation that adds no additional structure to the cooling mechanism. However, because the cooling mechanism of the Fujii et al. combination is structurally similar to that instantly disclosed, appears capable of performing the claimed process.

Claim 13: The rejection of claim 13 is as set forth above in claim 12. Further, the recitation "the cooling mechanism cools the bipolar plate from the side of the second gas passage" has been considered, and construed as a process limitation that adds no additional structure to the cooling mechanism. However, because the cooling mechanism of the Fujii et al. combination is structurally similar to that instantly disclosed, appears capable of performing the claimed process.

Claim 14: The rejection of the claim is as set forth above in claim 13. Further, the recitation, " wherein: the cooling mechanism cools the bipolar plate so that the temperature of the gas flowing through the first gas passage is lower, the nearer the gas inlet is" has been considered, and construed as a process limitation that adds no additional structure to the cooling mechanism. However, because the cooling mechanism of the Fujii et al. combination is structurally similar to that instantly disclosed, appears capable of performing the claimed process.

12. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. in view of Nelson et al., and further in view of Kaufman et al. as applied to claims 1-2 above, and further in view of Issacci et al. (US 2003/0129468).

Fujii et al., Nelson et al. and Kaufman et al. are as applied, argued, and disclosed above, and incorporated herein.

Claim 4: The Fujii et al. combination does not disclose a first gas passage comprising:

an upstream gas passage whereof one end is connected to the gas inlet and the other end is closed, and a downstream gas passage whereof one end is closed and the other end is connected to the communicating passage.

Issacci et al. in Figures 1-3 disclose a first gas passage comprising:

an upstream gas passage whereof one end is connected to the gas inlet and the other end is closed, and a downstream gas passage whereof one end is closed and the other end is connected to the communicating passage. See abstract, paragraphs [0030]-[0052], and [0062]-[0064].

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of the Fujii et al. combination by incorporating the first gas passage of Issacci et al. because Issacci et al. teach a first gas passage that would have provided for efficiently removing water produced at the cathode plates of a PEM fuel cell which would have enhanced the flow of cathode gas to the catalytic area and avoided the loss of cathode gas thereby improving the overall efficiency and performance of the fuel cell.

13. Claims 7-8 and 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. in view of Nelson et al., and further in view of Kaufman et al. as applied to claims 1-2, 5-6 and 14 above, and further in view of Takahashi et al. (7,049,016).

Fujii et al. , Nelson et al. and Kaufman et al. are as applied, argued and disclosed above, and incorporated herein.

Claim 7: The Fujii et al. combination does not disclose a differential pressure regulating mechanism which regulates the differential pressure by regulating the pressure loss in the communicating passage.

Takahashi et al. in Figure 1 discloses a differential pressure regulating mechanism (controller). See col. 1: 55-col. 2: 49 and col. 3: 9-58.

The recitation "which regulates the differential pressure by regulating the pressure loss in the communicating passage" has been considered, and construed as a functional language that adds no additional limitation to the differential pressure regulating mechanism. However, Takahashi et al. on col. 3: 23-34 teaches a controller 16 comprising one, two or more microprocessors, a memory and an input/output interface. The controller 16 calculates a pressure difference ΔP between the cooling water passage 9 and electrodes, a cathode 2 and anode 3 at the inlet of the fuel cell stack 1, from the signals from the pressure sensors 5, 6, 7. When the system is started, the controller 16 determines a pressure Pcw of cooling water according to the internal temperature Tsin of the fuel cell stack 1 detected by the temperature sensor 15, and controls the opening of a pressure reducing valve 11 and the rotation speed of the cooling water pump 12 so that a determined cooling water pressure Pcw is realized.

In light of this disclosure, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the controller and the pressure sensors to regulates the differential pressure by regulating the pressure loss in the communicating passage because Takahashi et al. teach a differential pressure regulating mechanism that would have prevented clogging, maintained a proper water balance, and enhanced startup of the fuel cell system, thereby improving overall performance.

Claim 8: The rejection of claim 8 is as set forth above in claim 7 wherein further it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the controller and the pressure sensors to regulates the pressure loss according to the load of the fuel cell.

Claim 15: The Fujii et al. combination does not disclose a controller which functions to: regulate the cooling performance of the cooling mechanism so that the temperature of the gas discharged from the gas outlet is higher, the larger the gas pressure or gas usage rate of the fuel cell is.

Takahashi et al. in Figure 4 and 6 discloses a controller (16) to regulate the cooling performance of the cooling mechanism. See col. 5: 36-col. 7: 29.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the cooling mechanism of the Fujii et al. combination by incorporating the controller of Takahashi et al. because Takahashi et al. teach a controller that would have provided efficient water flow to the cooling water passage during startup from a low temperature, maintained water balance and resolved problems associated with clogging thereby improving the overall efficiency and performance of the fuel cell stack.

The recitation, "so that the temperature of the gas discharged from the gas outlet is higher, the larger the gas pressure or gas usage rate of the fuel cell is" has been considered, and construed as a functional limitation that adds no additional limitation to the controller. However, because the controller of Takahashi et al. is structurally similar to that instantly claimed, it appears capable of performance the claimed function.

Claim 16: The rejection is as set forth above in claim 15. However, the recitation, "so that the temperature gradient of the gas flowing through the first gas passage increases, the higher the temperature or humidity of the gas at the gas inlet is" has been considered, and construed as a functional limitation that adds no additional limitation to the controller. However, because the controller of Takahashi et al. is structurally similar to that instantly claimed, it appears capable of performance the claimed function.

Claim 17: The rejection is as set forth above in claim 15. However, the recitation, "so that the temperature gradient of the gas flowing through the first gas passage increases, the larger the gas usage rate of the fuel cell is" has been considered, and construed as a functional that limitation that adds no additional limitation to the controller. However, because the controller of Takahashi et al. is structurally similar to that instantly claimed, it appears capable of performance the claimed function.

14. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. in view of Nelson et al., and further in view of Kaufman et al. as applied to claims 1-2 above, and further in view of Ringel (US 5,932,366).

Fujii et al., Nelson et al. and Kaufman et al. are as applied, argued, and disclosed above, and incorporated herein.

Claim 9: The Fujii et al. combination does not disclose that the communicating passage is a through-hole passing through the bipolar plate.

Ringel in Figure 12 discloses that the communicating passage is a through-hole passing through the bipolar plate (abstract and col. 3: 55-col. 4: 37).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the fuel cell of the Fujii et al. combination by incorporating the communicating passage of Ringel because Ringel teaches a communication passage that would have provided a means for uniformly heating the fuel cell stack thereby reducing thermal tensions and improving the overall life, integrity, and performance of the fuel cell stack.

Claim 10: The Fujii et al. combination does not disclose that the through-hole has a smaller cross-sectional area than the cross-sectional area of the first gas passage. However, one skilled in the art would know that decreasing the cross section area of the through hole would increase the pressure and flow of gas through the passage. Therefore, it would have been within the skill of one having ordinary skill in the art at the time the invention was made to have modified the cross-sectional area of the through-hole depending upon the desired pressure and gas flow through the through-hole.

15. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. (US2002/0055031) in view of Nelson et al. (US 6,150,049).

Claim 18: Fujii et al. in Figures 1-4 disclose a fuel cell, comprising:

a membrane electrode assembly (abstract),

a monopolar plate (10) disposed outside the membrane electrode assembly and

a cooling mechanism (10) which cools the monopolar plate, wherein: the monopolar plate is solid, and comprises:

a gas inlet (12C) for introducing gas,

(13C) a gas outlet for discharging gas,

a first gas passage (211A) formed on a surface on the side of the membrane electrode assembly, whereof one end is connected to the gas inlet and the other end is connected to a return part (201), and

a second gas passage (211B) formed parallel to the first gas passage on the surface on the side of the membrane electrode assembly, whereof one end is connected to the first gas passage via the return part (201) and the other end is connected to the gas outlet. See paragraphs [0019]-[0024], [0026]-[0027], [0065]-[0125], [0135]-[0144].

The recitation, "the cooling mechanism cools the bipolar plate so that the temperature of the gas flowing through the first gas passage is lower, the nearer the gas inlet is" has been considered as a function limitation that adds no additional structure to the cooling mechanism. However, because the cooling mechanism is the same as that instantly claimed, it anticipates the claimed function.

Fujii et al. do not disclose a bipolar plate comprising a gas diffusion layer provided between the membrane electrode assembly and the bipolar plate.

Nelson et al. in Figure 3 disclose a bipolar plate comprising a gas diffusion layer (60 or 62) provided between the membrane electrode assembly (54, 56, 58, collectively) and the bipolar plate (46 or 48). Nelson et al. on col. 4: 46-47, "As in known in the art, fluid flow plates may include bipolar and monopolar plates". See also col. 1: 38-46 and col. 4: 13-col. 6: 12.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the apparatus of Fujii et al. by incorporating bipolar plates as taught by Nelson et al. because Nelson et al. teach a bipolar plate comprising a gas diffusion layer provided between the membrane electrode assembly and the bipolar plate that would have increased the hydration distribution along the membrane thereby improving the overall performance of the fuel cell.

16. Claims 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. in view of Nelson et al. as applied to claim 18 above, and further in view of Takahashi et al. (US 7,049,016).

Fuji et al. and Nelson et al. are as applied, argued, and disclosed above, and incorporated herein.

Claim 19: The Fujii et al. combination does not disclose a controller which functions to: regulate the cooling performance of the cooling mechanism so that the temperature of the gas discharged from the gas outlet is higher, the larger the gas pressure or gas usage rate of the fuel cell is.

Takahashi et al. in Figure 4 and 6 discloses a controller (16) to regulate the cooling performance of the cooling mechanism. See col. 5: 36-col. 7: 29.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the cooling mechanism of Fujii et al. combination by incorporating the controller of Takahashi et al. because Takahashi et al. teach a controller that would have provided efficient water flow to the cooling water passage during startup from a low temperature, maintained water balance and resolved problems associated with clogging thereby improving the overall efficiency and performance of the fuel cell stack.

The recitation, "so that the temperature of the gas discharged from the gas outlet is higher, the larger the gas pressure or gas usage rate of the fuel cell is" has been considered, and construed as a functional limitation that adds no additional limitation to the controller. However, because the controller of Takahashi et al. is structurally similar to that instantly claimed, it appears capable of performance the claimed function.

Claim 20: The rejection is as set forth above in claim 19. However, the recitation, "so that the temperature gradient of the gas flowing through the first gas passage increases, the higher the temperature or humidity of the gas at the gas inlet is" has been considered, and construed as a functional limitation that adds no additional limitation to the controller. However, because the controller of Takahashi et al. is structurally similar to that instantly claimed, it appears capable of performance the claimed function.

Claim 21: The rejection is as set forth above in claim 19. However, the recitation, "so that the temperature gradient of the gas flowing through the first gas passage increases, the larger the gas usage rate of the fuel cell is" has been considered, and construed as a functional that limitation that adds no additional limitation to the controller. However, because the controller of

Takahashi et al. is structurally similar to that instantly claimed, it appears capable of performance the claimed function.

Conclusion

17. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS H. PARSONS whose telephone number is (571)272-1290. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Thomas H Parsons
Examiner
Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795